

## CLAIMS

1. An endo-type  $\alpha$ -L-fucosidase having the following physical and chemical properties:

5 (I) acting on a sulfated fucan derived from a sea cucumber to hydrolyze an  $\alpha$ -L-fucosyl bond and convert the sulfated fucan into smaller molecules;

(II) having an optimal pH of about 7 to 9; and

(III) having an optimal temperature of about 25

10 to 45°C.

2. A method for producing the endo-type  $\alpha$ -L-fucosidase defined by claim 1, the method comprising culturing a bacterium of the genus *Fucoidanobacter* capable of producing the endo-type  $\alpha$ -L-fucosidase defined by claim 15 1, and collecting the enzyme from the culture.

3. A sulfated fucan sulfatase having the following physical and chemical properties:

20 (I) acting on a sulfated fucan derived from a sea cucumber to hydrolyze a sulfate ester bond, release sulfuric acid, and promote conversion of the sulfated fucan derived from a sea cucumber into smaller molecules in the presence of the endo-type  $\alpha$ -L-fucosidase defined by claim 1 as compared with conversion achieved by allowing the endo-type  $\alpha$ -L-fucosidase defined by claim 1 to act alone;

25 (II) having an optimal pH of about 6 to 8; and

(III) having an optimal temperature of about 20 to 45°C.

4. A method for producing the sulfated fucan sulfatase defined by claim 3, the method comprising 5 culturing a bacterium of the genus *Fucoidanobacter* capable of producing the sulfated fucan sulfatase defined by claim 3, and collecting the enzyme from the culture.

5. A method for producing a sulfated fucan oligosaccharide, the method comprising allowing the endo-type α-L-fucosidase defined by claim 1 to act on a sulfated fucan, and obtaining a sulfated fucan oligosaccharide from 10 the reaction.

6. The method according to claim 5, wherein the endo-type α-L-fucosidase is allowed to act in the presence 15 of sodium chloride.

7. A sulfated fucan oligosaccharide which is obtainable by the method defined by claim 5.

8. A method for producing a sulfated fucan oligosaccharide, the method comprising allowing the endo-type α-L-fucosidase defined by claim 1 and the sulfated fucan sulfatase defined by claim 3 to act on a sulfated fucan, and obtaining a sulfated fucan oligosaccharide from 20 the reaction.

9. The method according to claim 8, wherein the endo-type α-L-fucosidase and the sulfated fucan sulfatase 25

are allowed to act in the presence of sodium chloride and/or a calcium ion.

10. A sulfated fucan oligosaccharide which is obtainable by the method defined by claim 8.